

[illegible]

1. An apparatus for measuring displacement, the apparatus comprising:
 - a machine element having an interior wall and an exterior wall and further having a first end wall substantially enclosing the interior wall and the exterior wall;
 - a shaft element movable within the machine element;
 - a head element attached to the shaft element adjacent to the interior wall of the machine element;
 - a light source attached to the machine element; and
 - a sensor attached to the machine element and positioned to detect intensity of light within the machine element.
2. The apparatus of Claim 1 further comprising:
 - a coating on the shaft element.
3. The apparatus of Claim 1 further comprising:
 - a coating on the interior wall of the machine element.
4. The apparatus of Claim 1 further comprising:
 - a seal disposed around the shaft element.
5. The apparatus of Claim 1 further comprising:
 - a second end wall opposite to the first end wall wherein the second end wall has a groove.
6. The apparatus of Claim 1 further comprising:
 - a first brush positioned at the end wall of the machine element.
7. The apparatus of Claim 6 wherein the first brush is constructed from wire.
8. The apparatus of Claim 1 further comprising:
 - a second brush positioned at the end wall of the machine element.
9. The apparatus of Claim 8 wherein the second brush is constructed from bronze.
10. The apparatus of Claim 1 further comprising:

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11. An apparatus for cleaning a machine component, the apparatus comprising:

a shaft element movable within the machine element;

a first brush positioned at the end wall of the

12. The apparatus of Claim 11 further comprising:

13. The apparatus of Claim 11 further comprising:

14. The apparatus of Claim 11 further comprising:

15. The apparatus of Claim 11 further comprising:

16. The apparatus of Claim 11 further comprising:

17. A method for measuring displacement of a machine element, the method comprising the steps of:

providing a shaft element capable of movement within the machine element;

positioning the head element adjacent to the interior

attaching a light source to the machine element;

attaching a sensor to the machine element; and

[illegible]

18. The method of Claim 17 further comprising the steps of:
moving the shaft element; and
producing an output signal as the shaft element moves within the machine element.
19. The method of Claim 17 further comprising the steps of:
providing a processing unit that receives the output signal; and
displaying the output signal.
20. The method of Claim 17 further comprising the step of:
positioning a seal at the end wall of the machine element.
21. The method of Claim 17 further comprising the step of:
attaching a first brush to the machine element.
22. The method of Claim 17 further comprising the step of:
attaching a second brush to the machine element.